



CAS-03463-R2W9C2 - Kronospan Low Carbon CHP Facility

Environmental Statement

Vol2: Chapter 12.0 – Mitigation Schedule and Summary of Residual Effects

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12.0 MITIGATION SCHEDULE AND SUMMARY OF RESIDUAL EFFECTS

12.1 Mitigation Schedule

Overview

12.1.1 **Table 12.1** below provides a summary overview of

- The proposed mitigation measures included in the design of the Proposed Development (initial development design and impact avoidance/reduction measures). These measures are referenced in **Table 12.1** as ‘M1’.
- The proposed further mitigation and monitoring measures following the initial assessment (which have subsequently informed the residual effects section in **ES Chapters 5.0 – 11.0 (topic chapters)**). These measures are referenced in **Table 12.1** as ‘M2’.

12.1.2 The approach to the identification of mitigation measures is introduced in **Section 2.5 of ES Chapter 2.0 (EIA Methodology)** and described in further detail in **ES Chapter 4.0 (Description of the Proposed Development)** and **ES Chapters 5.0 – 11.0 (topic chapters)**.

12.1.3 Proposed biodiversity mitigation and enhancement is summarised in the paragraphs beneath **Table 12.2**.

Mitigation Classification

12.1.4 The classification of mitigation is summarised below and set out in more detail at **Section 2.5 of ES Chapter 2.0 (EIA Methodology)**.

12.1.5 The IEMA Impact Assessment Guidelines document ‘Implementing the Mitigation Hierarchy from Concept to Construction (2024)’ states that *“classifying mitigation measures into one of three key types helps to achieve a more proportionate ES, as it allows for some mitigation measures to be taken-as-read in assessing effects (i.e. these mitigations are embedded intrinsically into the project design as set out in the project description.”* There are three distinct forms of mitigation as follows:

- **Primary (inherent)** - An inherent part of the project design and should be described in the design evolution narrative and included in the project description.



- **Secondary (foreseeable)** - Requires further activity to achieve the anticipated outcome – typically, these will be described in the ES chapters but often secured through planning conditions, requirements, and/or management plans.
- **Tertiary (inexorable)** - Required regardless of any EIA assessment as it is imposed, for example, because of legislative requirements and/or standard sectoral practices.

12.2 Summary of Residual Effects

Overview

- 12.2.1 **ES Chapters 5.0 – 11.0 (topic chapters)** have considered the potential environmental impacts and effects of the Proposed Development. **Table 12.2** below provides a summary of the likely environmental effects of the Proposed Development that have been identified, following the assumed implementation of the proposed ‘initial development design and impact avoidance/reduction measures’ (which are summarised in **Table 12.1**).
- 12.2.2 **Table 12.2** also provides a summary of the residual effects following the assumed additional implementation of the proposed ‘further mitigation and monitoring measures’ (also summarised in **Table 12.1**).

Nature of Effect

- 12.2.3 To provide further clarity on the nature of the effects described in **Table 12.2**, each has been identified for the purposes of this summary as follows:
- **Short term (St)** – Effects occurring only over a short period of time. As the Proposed Development is designed (and assessed) to be permanent, medium-term effects (occurring for the duration of the Proposed Development’s operation) and long-term effects (occurring beyond the operation of the Proposed Development) are deemed to be covered under ‘permanent’ effects (see below).
 - **Temporary (T)** – Effects that are not permanent because the effect would no longer occur if the impact was removed within the relevant timescale.
 - **Permanent (P)** – Effects that remain and cannot be readily reversed within the relevant timescale.
 - **Direct (D)** – Effects that result from a direct impact.



- **Indirect (In)** – Also known as secondary effects, effects that result indirectly.



Table 12.1 – Summary of Mitigation Measures

Development Stage	Initial Development Design and Impact Avoidance / Reduction Measures (M1)	(M1) Mitigation Classification	Further Mitigation and Monitoring (M2)	(M2) Mitigation Classification
ES Chapter 4.0 – Description of the Proposed Development				
Construction	A Framework Construction Environmental Management Plan (CEMP) (DNS4-003) has been provided with the DNS application and would be implemented for the construction phase of the Proposed Development.	Primary	A series of phase specific CEMP documents (as required) which define specific measures to be adopted during the construction of the various components of the Proposed Development would be produced (post-consent) by the Principal Contractor and form part of the CEMP. The CEMP would become a 'live' document, updated as required during the construction phase and managed by the PC.	Secondary
Decommissioning	The decommissioning phase will be supported by a Decommissioning Environmental Management Plan (DEMP) which will include measures similar to those proposed as part of the CEMP.	Secondary	N/A	N/A
Operation	The careful placement of the Proposed Development, away from residential receptors and close to existing energy-related components (and the existing stacks) would serve to minimise the visual impact of the proposed Low Carbon CHP Facility.	Primary	N/A	N/A
Operation	The careful consideration of the layout and arrangement of the proposed Low Carbon CHP Facility to ensure the	Primary	N/A	N/A

Development Stage	Initial Development Design and Impact Avoidance / Reduction Measures (M1)	(M1) Mitigation Classification	Further Mitigation and Monitoring (M2)	(M2) Mitigation Classification
	relatively restricted space can be utilised for the proposed CHP Facility and achieve the core objective of generating up to 40 MW of electricity and 125 MW of thermal energy for use in the existing manufacturing processes at the existing Kronospan Facility (via a maximum feedstock throughput capacity of 293,000 tonnes per annum), whilst not resulting in unacceptable environmental impact.			
Operation	Improving the efficiency of the existing chip screening process to enable the existing chip silos to hold screened chips (rather than unscreened chips). This would have the benefit of enabling the two silos granted under planning reference P/2022/0765 to be repurposed as feedstock storage for the Proposed Development, subsequently requiring fewer 'new' feedstock storage facilities for the Proposed Development.	Primary	N/A	N/A
Operation	Stack height determined by running the air quality dispersion model for a range of stack heights and identifying the point at which there is a diminished reduction in ground level concentration (of oxides of nitrogen) with increased stack height. A stack height of 75m is the point at which increasing the height of the stack further has a diminished reduction in ground level concentration; as such, a height of 75m is concluded to be the appropriate stack height for the proposed Low Carbon CHP Facility.	Primary	N/A	Secondary

Development Stage	Initial Development Design and Impact Avoidance / Reduction Measures (M1)	(M1) Mitigation Classification	Further Mitigation and Monitoring (M2)	(M2) Mitigation Classification
Operation	External finish of the proposed Low Carbon CHP Facility to be finished in goosewing grey cladding to match surrounding energy infrastructure and other structures on the existing Kronospan Facility.	Primary	N/A	N/A
Operation	A Dust Management Plan (DMP) and Odour Management Plan (OMP) are in place for the existing Kronospan Facility, which have been developed in line with the requirements of Natural Resources Wales (NRW) and include details of the management procedures, mitigation measures, monitoring, reporting, actions and identified improvements and a timeline for implementation. These management plans will be revised to include the Proposed Development.	Primary and Tertiary	N/A	N/A
ES Chapter 5.0 – Noise and Vibration				
Construction and Decommissioning	Restriction of construction hours to non-sensitive times of day would normally form part of the planning consent conditions. The construction delivery hours proposed would be generally limited to 07.30 to 18.00hrs Monday to Friday and 08.00 to 14.00hrs Saturday. No work on Sundays or Bank Holidays, however there may be occasions when construction would need to be undertaken outside of the core hours, for example, during major concrete pours or the transfer of abnormal loads. The above construction hour restrictions have been implemented on previous Kronospan projects and will be	Primary	N/A	N/A

Development Stage	Initial Development Design and Impact Avoidance / Reduction Measures (M1)	(M1) Mitigation Classification	Further Mitigation and Monitoring (M2)	(M2) Mitigation Classification
	implemented during the construction of the forthcoming North Access Road works.			
Construction and Decommissioning	Avoid unnecessary plant operation and revving of plant or vehicles.	Tertiary	N/A	N/A
Construction and Decommissioning	Sensible routing of the construction plant to avoid the nearest residential properties (where practicable).	Secondary	N/A	N/A
Construction and Decommissioning	Use of non-percussive piling (e.g. CFA or hydraulic piling) where practicable.	Tertiary	N/A	N/A
Construction and Decommissioning	Where necessary, monitoring of site noise levels at Noise Sensitive Receptors.	Tertiary	N/A	N/A
Construction and Decommissioning	Where practicable, locate plant away from nearest sensitive receptors or in locations which provide good screening in the direction of sensitive receptors.	Tertiary	N/A	N/A
Construction and Decommissioning	Use of broadband noise reverse alarms (where practicable) on mobile plant.	Tertiary	N/A	N/A
Construction and Decommissioning	Regular maintenance of plant and equipment.	Tertiary	N/A	N/A
Construction and Decommissioning	Inform local residents of the works being undertaken and provide a complaints procedure for local residents to enable them to contact the Site should any issues arise in terms of noise.	Tertiary	N/A	N/A

Development Stage	Initial Development Design and Impact Avoidance / Reduction Measures (M1)	(M1) Mitigation Classification	Further Mitigation and Monitoring (M2)	(M2) Mitigation Classification
Construction and Decommissioning	Contact local residents prior to construction works commencing advising of anticipated duration and a contact number to advise of any issues/concerns.	Tertiary	N/A	N/A
Operation	Buildings containing CHP plant [i.e. Boiler Room, Turbine Hall, Pre-Crushers, ID Fan, Bag Filter, NOx, Storage and Service Room) constructed from single skin cladding (Weighted Sound Reduction Index (Rw) = 22dB)). This mitigation is superseded by that set out in Column 4 (further mitigation and monitoring).	Primary	Boiler Room, Turbine Hall, Bagging Plant, Pre-crushers buildings and ID Fan acoustic enclosure constructed from double skin acoustic cladding (Rw = 32dB).	Secondary
			Nox, Storage and Service Room constructed from double skin acoustic cladding (Rw = 28dB).	
Operation	Air cooled condenser fans operating to a sound power level of 102dB(A) (i.e. 6 fans at 94dB(A) sound power level).	Primary	N/A	N/A
Operation	Turbine Air Cooler Fans – overall sound power level with all fans operating designed to a level of 90dB(A) (i.e. circa <80dB LAeq at 1m).	Primary	N/A	N/A
Operation	Fan stack designed to a sound power level of 90dB(A) at stack exit point (i.e. circa <80dB LAeq at 1m/90deg to stack outlet).	Primary	N/A	N/A
Operation	Smaller external plant (i.e. pumps) designed to a sound power level of 90dB(A) (i.e. circa <80dB LAeq at 1m).	Primary	N/A	N/A

Development Stage	Initial Development Design and Impact Avoidance / Reduction Measures (M1)	(M1) Mitigation Classification	Further Mitigation and Monitoring (M2)	(M2) Mitigation Classification
Operation	Boiler roof vents designed to a sound power level of 80dB(A).	Primary	N/A	N/A
Operation	ID Fan acoustically enclosed to achieve a design noise level of 65dB(A) @ 1m.	Primary	N/A	N/A
Operation	Pre-crusher plant fitted inside an enclosure fitted with acoustic cladding to Rw 32dB and insulated roller shutter doors fitted to openings. This mitigation is superseded by that set out in Column 4 (further mitigation and monitoring).	Primary	Pre-crusher plant fitted inside an enclosure fitted with acoustic cladding to Rw 35dB and insulated roller shutter doors fitted to openings.	Secondary
Operation	Sound power levels of plant as detailed in Appendix 5E .	Primary	N/A	N/A
Operation	Design to include control of noise character (i.e. tonality and impulsivity) in accordance with BS4142:2014+A1:2019.	Primary	N/A	N/A
Operation	Mobile plant to be fitted with non-tonal reversing alarms (i.e. broad band noise type noise alarms).	Tertiary	N/A	N/A
Operation	N/A	N/A	Ducting from ACC to Turbine, Turbine ducting and NOx ducting (external to buildings or enclosures) to be acoustically clad with insulation and solid outer skin.	Secondary
ES Chapter 6.0 – Air Quality and Odour				

Development Stage	Initial Development Design and Impact Avoidance / Reduction Measures (M1)	(M1) Mitigation Classification	Further Mitigation and Monitoring (M2)	(M2) Mitigation Classification
Construction and Decommissioning	Communications - Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	Tertiary	N/A	N/A
Construction and Decommissioning	Communications - Display the head or regional office contact information.	Tertiary	N/A	N/A
Construction and Decommissioning	Site Management - Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	Tertiary	N/A	N/A
Construction and Decommissioning	Site Management - Make the complaints log available to the local authority when asked.	Tertiary	N/A	N/A
Construction and Decommissioning	Site Management - Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook.	Tertiary	N/A	N/A
Construction and Decommissioning	Monitoring - Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.	Tertiary	N/A	N/A
Construction and Decommissioning	Monitoring - Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust	Tertiary	N/A	N/A

Development Stage	Initial Development Design and Impact Avoidance / Reduction Measures (M1)	(M1) Mitigation Classification	Further Mitigation and Monitoring (M2)	(M2) Mitigation Classification
	are being carried out and during prolonged dry or windy conditions.			
Construction and Decommissioning	Preparing and Maintaining the Site - Plan site layout so that machinery and dust causing activities are away from receptors, as far as is possible.	Tertiary	N/A	N/A
Construction and Decommissioning	Preparing and Maintaining the Site - Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	Tertiary	N/A	N/A
Construction and Decommissioning	Preparing and Maintaining the Site - Avoid site runoff of water or mud.	Tertiary	N/A	N/A
Construction and Decommissioning	Machinery/Vehicle Operation - Ensure all vehicles switch off engines when stationary - no idling vehicles.	Tertiary	N/A	N/A
Construction and Decommissioning	Machinery/Vehicle Operation - Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable.	Tertiary	N/A	N/A
Construction and Decommissioning	Operations - Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	Tertiary	N/A	N/A

Development Stage	Initial Development Design and Impact Avoidance / Reduction Measures (M1)	(M1) Mitigation Classification	Further Mitigation and Monitoring (M2)	(M2) Mitigation Classification
Construction and Decommissioning	Operations - Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	Tertiary	N/A	N/A
Construction and Decommissioning	Operations - Use enclosed chutes and conveyors and covered skips.	Tertiary	N/A	N/A
Construction and Decommissioning	Operations - Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	Tertiary	N/A	N/A
Construction and Decommissioning	Waste management - Avoid bonfires and burning of waste materials.	Tertiary	N/A	N/A
Construction and Decommissioning	Demolition - Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	Tertiary	N/A	N/A
Construction and Decommissioning	Demolition - Avoid explosive blasting, using appropriate manual or mechanical alternatives.	Tertiary	N/A	N/A
Construction and Decommissioning	Demolition - Bag and remove any biological debris or damp down such material before demolition.	Tertiary	N/A	N/A

Development Stage	Initial Development Design and Impact Avoidance / Reduction Measures (M1)	(M1) Mitigation Classification	Further Mitigation and Monitoring (M2)	(M2) Mitigation Classification
Operation	To operate the proposed Low Carbon CHP Facility, the existing Environmental Permit for the Kronospan Facility will need to be varied. The proposed Low Carbon CHP Facility will comply with the requirements of the (to be) varied Environmental Permit.	Secondary and Tertiary	N/A	N/A
Operation	<p>As part of the Environmental Permit, all emissions, including fugitive dust and odour, are required to be controlled to ensure there is no impact beyond the installation site boundary. To comply with this, the design of the proposed Low Carbon CHP Facility includes several embedded mitigation measures, including that fuel will be transferred to the proposed Low Carbon CHP Facility using walking floor trailers, and the opening of the building will include a mist air system and curtains. This would prevent the release of odours and dust from the proposed Low Carbon CHP Facility.</p> <p>The Odour Management Plan (OMP) for the existing Kronospan Facility includes measures to manage incoming fuel if identified as being particularly odorous. The OMP will be extended to include the proposed Low Carbon CHP Facility although it is not expected that the measures will change as those already contained will be suitable to also control odour from the proposed Low Carbon CHP Facility.</p>	Secondary and Tertiary	N/A	N/A

Development Stage	Initial Development Design and Impact Avoidance / Reduction Measures (M1)	(M1) Mitigation Classification	Further Mitigation and Monitoring (M2)	(M2) Mitigation Classification
Operation	The existing Dust Management Plan for the existing Kronospan Facility will be extended to include the proposed Low Carbon CHP Facility.	Primary and Tertiary	N/A	N/A
Operation	N/A	N/A	Biodiversity mitigation and enhancement measures will be implemented to increase the resilience of the ecological habitats to air quality impacts. This includes new native woodland planting adjacent to existing woodland to the west of the canal corridor, and further new native woodland along the eastern side of the minor road (Llwyn-y-Cil) which forms the eastern boundary to the Chirk Castle Estate.	Secondary
ES Chapter 7.0 – Landscape and Visual Impact Assessment				
ES Chapter 8.0 - Historic Environment				
Construction, Decommissioning and Operation	See measures set out under ' ES Chapter 4.0 – Description of the Proposed Development)'.	Primary and Secondary		
Operation	N/A	N/A	Biodiversity mitigation and enhancement measures will be implemented to increase the resilience of the ecological habitats to air quality impacts. This includes new native woodland planting	Secondary

Development Stage	Initial Development Design and Impact Avoidance / Reduction Measures (M1)	(M1) Mitigation Classification	Further Mitigation and Monitoring (M2)	(M2) Mitigation Classification
			adjacent to existing woodland to the west of the canal corridor, and further new native woodland along the eastern side of the minor road (Llwyn-y-Cil) which forms the eastern boundary to the Chirk Castle Estate. See Section 12.2 below for further details.	
ES Chapter 9.0 – Climate Change Resilience				
Construction and Decommissioning	Weather conditions will be monitored.	Tertiary	N/A	N/A
Construction and Decommissioning	RAMS will be used. RAMS are important health and safety document that are completed to identify the steps to be undertaken to carry out a specific activity or task in a safe manner such as manual handling and inspection of the boiler).	Tertiary	N/A	N/A
Construction and Decommissioning	Construction workers will all have the correct personal protective equipment (PPE), be trained in Site health and safety and be informed about protecting themselves from extreme weather conditions.	Tertiary	N/A	N/A
Construction and Decommissioning	Construction materials would be covered when stored.	Tertiary	N/A	N/A

Development Stage	Initial Development Design and Impact Avoidance / Reduction Measures (M1)	(M1) Mitigation Classification	Further Mitigation and Monitoring (M2)	(M2) Mitigation Classification
Construction and Decommissioning	Proactive planning will be undertaken to account for the possibility of extreme weather events, including the use of extreme weather alert systems.	Tertiary	N/A	N/A
Construction and Decommissioning	Health and safety plans developed for construction activities will be required to account for potential climate change impacts on workers, such as flooding and heatwaves.	Tertiary	N/A	N/A
Construction and Decommissioning	The materials used during construction will be resilient to expected climatic extremes with British Standards applicable for most materials to ensure that extreme climatic conditions are accounted for	Tertiary	N/A	N/A
Operation	The materials used in the plant buildings and operational equipment will be resilient to expected climatic extremes with British Standards applicable for most materials to ensure that extreme climatic conditions are accounted for.	Tertiary	N/A	N/A
Operation	The ventilation system will be designed to withstand a range of temperatures greater than the currently experienced temperatures to account for climate change.	Primary	N/A	N/A
Operation	RAMS will be used.	Tertiary	N/A	N/A
Operation	Workers will all have the correct PPE, be trained in Site health and safety and will be informed about protecting themselves from extreme weather conditions.	Tertiary	N/A	N/A

Development Stage	Initial Development Design and Impact Avoidance / Reduction Measures (M1)	(M1) Mitigation Classification	Further Mitigation and Monitoring (M2)	(M2) Mitigation Classification
Operation	The proposed Low Carbon CHP Facility is sheltered from the wind as it is embedded within the design of the existing Kronospan Facility.	Primary	N/A	N/A
Operation	The proposed Low Carbon CHP Facility is designed to minimise water use. Additionally, the condensate from the flue gas treatment (FGT) system would be recirculated and reused in the boiler and any water not vapourised in the quenching process would be collected and recycled for continued use in the quenching process.	Primary	N/A	N/A
ES Chapter 9.0 – Greenhouse Gas Emissions				
Construction and Decommissioning	The proposed Low Carbon CHP Facility will employ good industry practice measures such as optimising the use of resources and minimising carbon throughout the value chain.	Tertiary	N/A	N/A
Construction and Decommissioning	Vehicles will be switched off when not in use and construction vehicles will be checked to ensure they conform to current UK emissions standards.	Tertiary	N/A	N/A
Construction and Decommissioning	Regular planned maintenance of the construction plant and machinery will be carried out to optimise efficiency.	Tertiary	N/A	N/A
Construction and Decommissioning	The proposed Low Carbon CHP Facility will be designed and constructed in such a way as to minimise the creation of waste and maximise the use of alternative materials with lower embodied carbon, such as locally sourced products	Primary	N/A	N/A

Development Stage	Initial Development Design and Impact Avoidance / Reduction Measures (M1)	(M1) Mitigation Classification	Further Mitigation and Monitoring (M2)	(M2) Mitigation Classification
	and materials with a higher recycled content where feasible.			
Construction and Decommissioning	Suitable infrastructure and resources already available within the existing Kronospan Facility would be reused where possible to minimise the use of natural resources and unnecessary materials.	Primary	N/A	N/A
Construction and Decommissioning	Recyclability would be increased by segregating construction waste to be re-used and recycled where reasonably practicable.	Tertiary	N/A	N/A
Operation	The proposed Low Carbon CHP Facility will be operated in such a way as to minimise the creation of waste.	Primary	N/A	N/A
Operation	The proposed Low Carbon CHP Facility will use biomass predominately sourced from on-site operations providing an on-site solution for the re-use of material.	Primary	N/A	N/A
ES Chapter 10.0 – Waste				
Construction	Framework CEMP (see ES Chapter 4.0 (Description of the Proposed Development) above). The overarching approach to waste management is set out in Section 2.7 of the Framework CEMP.	Primary	A series of phase specific CEMP documents (as required) which define specific measures to be adopted during the construction of the various components of the Proposed Development would be produced (post-consent) by the Principal Contractor and form part of the CEMP. The CEMP	Secondary

Development Stage	Initial Development Design and Impact Avoidance / Reduction Measures (M1)	(M1) Mitigation Classification	Further Mitigation and Monitoring (M2)	(M2) Mitigation Classification
			would become a 'live' document, updated as required during the construction phase and managed by the PC.	
Construction and Decommissioning	Sustainable waste management practices will be prioritised, including the reuse and recycling of key infrastructure components wherever feasible. Turbines will be sold for reuse where feasible, extending their operational life and reducing waste. Any hardstanding areas will be crushed and repurposed, minimising the need for new construction materials. Additionally, all metals recovered during demolition, construction and decommissioning will be recycled in accordance with industry standards and any waste wood will be recycled through the existing Kronospan Facility or the Proposed Development, contributing to a circular economy and reducing the environmental footprint of the project.	Primary		
Operation	The waste hierarchy will be central to the facility's waste strategy. Operational procedures will aim to source feedstock from the nearest sources to reduce the distance that feedstock will need to travel to the site.	Primary		
Operation	The proposed Low Carbon CHP Facility will be designed and operated to meet the criteria for R1 status under the Waste Framework Directive, confirming its classification as a recovery operation rather than disposal; further details are provided in the Heat and Power Plan (DNS4-004).	Primary		

Development Stage	Initial Development Design and Impact Avoidance / Reduction Measures (M1)	(M1) Mitigation Classification	Further Mitigation and Monitoring (M2)	(M2) Mitigation Classification
	Achieving R1 status demonstrates that the CHP plant delivers a high level of energy efficiency, ensuring that waste-derived fuels are used in a manner that provides a beneficial output of energy.			
			Ash constitutes approximately 4.1% of the proposed Low Carbon CHP Facility's throughput and, where feasible, should be sent to an appropriately licensed facility for recovery or beneficial reuse, such as in construction materials or aggregate production. This approach would support the minimisation of waste and would align with circular economy principles, reducing the need for landfill disposal and contributing to sustainable resource management.	Secondary
ES Chapter 11.0 – Population and Human Health				
Construction	Framework CEMP (see ES Chapter 4.0 (Description of the Proposed Development) above).	Primary	A series of phase specific CEMP documents (as required) which define specific measures to be adopted during the construction of the various components of the Proposed Development would be produced (post-consent) by the Principal Contractor and form part of the CEMP. The CEMP would become a 'live' document,	Secondary

Development Stage	Initial Development Design and Impact Avoidance / Reduction Measures (M1)	(M1) Mitigation Classification	Further Mitigation and Monitoring (M2)	(M2) Mitigation Classification
			updated as required during the construction phase and managed by the PC.	
Construction	A Construction Traffic Management Plan (CTMP) would be implemented to manage disturbances to the local community during the construction period. The CTMP is anticipated to be secured via a planning condition and such measures would include, but is not limited to: construction phasing and timescales; restrictions on vehicle delivery hours; HGV routing strategy; and staff parking arrangements.	Primary	N/A	N/A
Operation	A DMP and OMP (see ES Chapter 4.0 (Description of the Proposed Development) above) are in place for the existing Kronospan Facility, which have been developed in line with the requirements of Natural Resources Wales (NRW) and include details of the management procedures, mitigation measures, monitoring, reporting, actions and identified improvements and a timeline for implementation. These management plans will be revised to include the Proposed Development.	Primary	N/A	N/A

12.3 Biodiversity Mitigation and Enhancement

- 12.3.1 The Biodiversity Assessment Report (BAR) (**DNS4-007**) confirms that the air quality impacts of the Proposed Development would be unlikely affect the special features of Chirk Castle Site of Special Scientific Interest (SSSI) or result in an unacceptable level of harm to Canal Wood Local Wildlife Site (LWS). Nevertheless, there would be low magnitude impacts above the screening thresholds for both of these designations, and targeted off-site mitigation and enhancement measures are therefore proposed.
- 12.3.2 The priorities are to align with legislative and policy objectives, and in particular with the DECCA framework as described in paragraph 6.4.5 of PPW, with the over-arching aim to maintain ecosystem resilience. To provide an environmental enhancement, over and above the need for mitigation, ecosystem resilience needs to be improved relative to the current baseline conditions.
- 12.3.3 In the specific context of Chirk Castle SSSI and Canal Wood LWS, measures are targeted at maintaining and enhancing the integrity and resilience of the woodland habitat feature. The primary aim of mitigation measures is to protect against impacts of atmospheric nutrient pollution. However, enhancement measures are aimed at delivering wider benefits within the DECCA framework, such as improved habitat connectivity.
- 12.3.4 The mitigation and enhancement measures forming part of the Proposed Development (and illustrated on **Drawing DNS3-012**) comprise the following:
- New woodland planting is proposed adjacent to the north-western part of Canal Wood LWS, onto what is currently a former golf course, now agricultural grassland.
 - New woodland planting is proposed along the eastern boundary of Chirk Castle SSSI, also within the former golf course.

- 12.3.5 In both cases, the proposed planting is intended to buffer local pollution sources (e.g. emissions from fertilisers and livestock) - initially by removing adjoining land from agricultural management, then as trees become established, via interception of pollutants.
- 12.3.6 Both locations are within land under the control of the Applicant and thus can be delivered without the need for any agreement with third parties.
- 12.3.7 Key principles followed in the design of the proposed woodland planting are:
- Shelterbelts for buffering should ideally be 30-50m wide.
 - They should form a continuous barrier, rather than groups of trees separated by gaps.
 - The aim should be to achieve (once established) a range of tree and shrub heights, including a well-developed understorey and shrub layer.
 - Notwithstanding point iii), planting should not be too dense so as to impede airflow into the shelterbelt when established (this point is emphasised in guidance for shelterbelts around intensive agricultural units) - there is an optimum leaf area density for infiltration and deposition of pollutants.
 - Where the buffer is necessarily less than 30m wide, a greater foliage density is recommended.
 - Species choice should include trees with complex leaf shapes (e.g. field maple, *Acer campestre*) and include an evergreen component (e.g. holly, *Ilex aquifolium* and Scots pine, *Pinus sylvestris*) to maintain effective capture through the year.
 - For gaseous pollutant interception, anisohydric species which keep stomata open for longer in dry conditions may be more effective - these include oak (*Quercus*) and poplar (*Populus*) species.
- 12.3.8 The proposals shown indicatively on Drawing **DNS3-012** reflect these principles. Should consent be granted for the Proposed Development, it is envisaged that full details of the proposal would need to be agreed with WCBC. A Management Plan for the proposed

woodland planting would be prepared by the Applicant which would include details of implementation and establishment management, and long-term management and maintenance measures.

Table 12.2 – Summary of Likely Residual Effects

Development Stage	Environmental Receptor	Level of Effect (following initial development design and impact avoidance / reduction measures)	Residual Level of Effect (following further mitigation and monitoring)	Nature of Effect
ES Chapter 5.0 – Noise and Vibration				
Construction and Decommissioning	Plant noise – residential and recreational	Neutral to Minor adverse	Neutral to Minor adverse	St, T, D
Construction and Decommissioning	Plant noise - ecological	No exceedance of NE guidance thresholds relative to L_{Aeq} and L_{AFmax} for the Canal Wood LWS during peak noise activities.	No exceedance of NE guidance thresholds relative to L_{Aeq} and L_{AFmax} for the Canal Wood LWS during peak noise activities.	St, T, D
Construction and Decommissioning	Road traffic noise - residential and recreational	Neutral	Neutral	St, T, D
Construction and Decommissioning	Vibration (plant - residential)	Neutral	Neutral	St, T, D
Construction and Decommissioning	Vibration (HGVs) - residential	Minor	Minor	St, T, D
Operation	Plant noise - residential and recreational (daytime)	Neutral to Minor adverse	Neutral	P, D
Operation	Plant noise – residential and recreational (night-time)	Neutral to Moderate adverse (not significant)	Minor adverse for Chirk Marina (Canal Towpath) (R12) Neutral for all other (residential) receptors	P, D
Operation	Plant noise – ecological	Neutral	Neutral	P, D

Development Stage	Environmental Receptor	Level of Effect (following initial development design and impact avoidance / reduction measures)	Residual Level of Effect (following further mitigation and monitoring)	Nature of Effect
Operation	Road traffic noise - residential and recreational	Neutral	Neutral	P, D
Operation	Vibration (HGVs) - residential and recreational	Neutral (dwellings circa 3m from kerbside) Minor (dwellings less than 3m from kerbside)	Neutral (dwellings circa 3m from kerbside) Minor (dwellings less than 3m from kerbside)	P, D
Operation	Vibration (plant) - residential and recreational	Neutral	Neutral	P, D
ES Chapter 6.0 – Air Quality and Odour				
Construction	Construction dust – dust soiling	Negligible	Negligible	St, T, D
Construction	Construction dust – human health	Negligible	Negligible	St, T, D
Construction	Construction dust – ecology	Negligible	Negligible	St, T, D
Construction	Exhaust pollutants from construction traffic	Negligible	Negligible	St, T, D
Operation	Vehicle emissions – human health	Negligible	Negligible	P, D

Development Stage	Environmental Receptor	Level of Effect (following initial development design and impact avoidance / reduction measures)	Residual Level of Effect (following further mitigation and monitoring)	Nature of Effect
Operation	Process emissions – human health	Negligible	Negligible	P, D
Operation	Process emissions – ecology (European designated sites)	No likely significant effect	No likely significant effect	N/A
Operation	Process emissions – ecology (Chirk Castle SSSI)	See (non-EIA) BAR (DNS4-007) - a small magnitude exceedance of the screening thresholds is predicted, but this is not predicted to result in a measurable ecological effect of constitute an operation likely to damage the special interest of the SSSI.		P, D
Operation	Process emissions – ecology (Canal Wood LWS)	See (non-EIA) BAR (DNS4-007) - predicted impacts on Canal Wood LWS are not considered to result in unacceptable level of harm.		P, D
Operation	Dust and odour emissions	Negligible	Negligible	P, D
ES Chapter 7.0 – Landscape and Visual Impact Assessment				
Construction and Decommissioning	Landscape character	Neutral to Moderate adverse (not significant)	Neutral to Moderate adverse (not significant)	St, T, D
Construction and Decommissioning	Viewpoints	Neutral to Moderate adverse (not significant)	Neutral to Moderate adverse (not significant)	St, T, D
Construction and Decommissioning	Night-time landscape and visual effects	Night-time landscape and visual effects during the construction phase would be limited and would not be significant	Night-time landscape and visual effects during the construction phase would be limited and would not be significant	St, T, D

Development Stage	Environmental Receptor	Level of Effect (following initial development design and impact avoidance / reduction measures)	Residual Level of Effect (following further mitigation and monitoring)	Nature of Effect
Operation	Viewpoints A, B, D, E, H, N, X	Minor to Moderate adverse (not significant)	Minor to Moderate adverse (not significant)	P, D
Operation	Viewpoints C, K, L, M, R	Moderate adverse (not significant)	Moderate adverse (not significant)	P, D
Operation	Viewpoints F, G, W	Minor adverse	Minor adverse	P, D
Operation	Viewpoints I, J, Q	Minor adverse (short-term) No effect (long-term)	Minor adverse (short-term) No effect (long-term)	St, T, D
Operation	Viewpoints U, V	No effect	No effect	N/A
Operation	Night-time landscape and visual effects	Not significant	Not significant	P, D
Operation	Clwydian Range and Dee Valley Area of Outstanding Natural Beauty	Not materially affected	Not materially affected	P, D
ES Chapter 8.0 – Historic Environment				
Construction and Decommissioning	Below ground archaeology	No effect. Below ground works associated with the construction of previous developments within the Site will have impacted any archaeology that may have previously been present. No historic assets are recorded within the Site, and it has negligible archaeological potential.	No effect. Below ground works associated with the construction of previous developments within the Site will have impacted any archaeology that may have previously been present. No historic assets are recorded	N/A

Development Stage	Environmental Receptor	Level of Effect (following initial development design and impact avoidance / reduction measures)	Residual Level of Effect (following further mitigation and monitoring)	Nature of Effect
			within the Site, and it has negligible archaeological potential.	
Construction	Setting of historic assets	Not significant	Not significant	St, T, D
Operation	Pontcysyllte Aqueduct and Canal World Heritage Site and Scheduled Monument	Minor adverse	Minor adverse	P, D
Operation	Chirk Castle Grade I Registered Historic Park and Garden and Grade I Listed Gates, Screen and Piers	No effect	No effect	N/A
Operation	Offa's Dyke Scheduled Monument	No effect	No effect	N/A
Operation	Chirk Conservation Area	No effect	No effect	N/A
ES Chapter 9.0 – Climate Change Resilience				
Construction	The proposed Low Carbon CHP Facility's resilience to climate change has not been assessed during the construction phase. This is because if the proposed Low Carbon CHP Facility is consented, construction would occur in the near future when the climatic conditions are well understood and would be accounted for in the initial development design and impact avoidance/reduction measures outlined above. A Framework Construction Environmental Management Plan (CEMP) (DNS4-003) is provided with this DNS application and presents the approach to and the application of environmental management and mitigation for the construction of the proposed Low Carbon CHP Facility. A series of phase specific CEMP documents (as required) which define specific measures to be adopted during the construction of the various components of the Proposed Development would be produced (post-consent) by the Principal Contractor (PC).			

Development Stage	Environmental Receptor	Level of Effect (following initial development design and impact avoidance / reduction measures)	Residual Level of Effect (following further mitigation and monitoring)	Nature of Effect
Decommissioning	The proposed Low Carbon CHP Facility's resilience to climate change has not been assessed during the decommissioning phase. This is because decommissioning of the proposed Low Carbon CHP Facility is too far in the future. A Decommissioning Environmental Management Plan (DEMP) would be prepared in advance of decommissioning for approval which would be adapted to account for the climatic conditions at the time of decommissioning. This would include similar measures as proposed as part of the CEMP.			
Operation	Increased winter precipitation – plant buildings and operation	Negligible	Negligible	P, D
Operation	Increased winter precipitation – vehicular access to the Site	Slight	Slight	P, D
Operation	Increased winter precipitation – grid connection and local users	Not likely to affect receptor	Not likely to affect receptor	N/A
Operation	Increased winter precipitation – on-site workers	Not likely to affect receptor	Not likely to affect receptor	N/A
Operation	Increased frequency and magnitude of wind and storms - plant buildings and operation	Negligible	Negligible	P, D
Operation	Increased frequency and magnitude of wind and storms – vehicular access to the Site	Slight	Slight	P, D

Development Stage	Environmental Receptor	Level of Effect (following initial development design and impact avoidance / reduction measures)	Residual Level of Effect (following further mitigation and monitoring)	Nature of Effect
Operation	Increased frequency and magnitude of wind and storms – grid connection and local users	Not likely to affect receptor	Not likely to affect receptor	N/A
Operation	Increased frequency and magnitude of wind and storms – on-site workers	Slight	Slight	P, D
Operation	Decreased summer precipitation - plant buildings and operation	Negligible	Negligible	P, D
Operation	Decreased summer precipitation – vehicular access to the Site	Not likely to affect receptor	Not likely to affect receptor	N/A
Operation	Decreased summer precipitation – grid connection and local users	Not likely to affect receptor	Not likely to affect receptor	N/A
Operation	Decreased summer precipitation – on-site workers	Not likely to affect receptor, water supplier include mitigation to ensure a supply for welfare facilities	Not likely to affect receptor, water supplier include mitigation to ensure a supply for welfare facilities	N/A
Operation	Increases in summer temperatures - plant buildings and operation	Negligible	Negligible	P, D

Development Stage	Environmental Receptor	Level of Effect (following initial development design and impact avoidance / reduction measures)	Residual Level of Effect (following further mitigation and monitoring)	Nature of Effect
Operation	Increases in summer temperatures – vehicular access to the Site	Not likely to affect receptor	Not likely to affect receptor	N/A
Operation	Increases in summer temperatures – grid connection and local users	Not likely to affect receptor	Not likely to affect receptor	N/A
Operation	Increases in summer temperatures – on-site workers	Negligible	Negligible	P, D
ES Chapter 9.0 – Greenhouse Gas Emissions				
Construction (including demolition), Operation, and Decommissioning	Atmosphere	The Proposed Development would result in a net carbon benefit of ~3,024,740 tCO ₂ e over its lifetime, provides carbon benefits throughout each carbon budget period considered, and is consistent with existing and emerging policy requirements. Therefore, it is considered the Proposed Development would have a significant beneficial effect on climate change.		P, D
ES Chapter 10.0 – Waste				
Construction	Demolition waste	Neutral or slight	Neutral or slight	St, T, D
Construction	Construction waste	Neutral or slight	Neutral or slight	St, T, D
Decommissioning	As set out for 'construction' above	Neutral or slight	Neutral or slight	St, T, D
Operation	Ash	Neutral or slight	Neutral or slight	P, D

Development Stage	Environmental Receptor	Level of Effect (following initial development design and impact avoidance / reduction measures)	Residual Level of Effect (following further mitigation and monitoring)	Nature of Effect
Operation	Air Pollution Control Residue	Slight	Slight	P, D
ES Chapter 11.0 – Population and Human Health				
Construction	Health effects from changes in air quality	Negligible	Negligible	St, T, D
Construction	Health effects from changes in noise exposure	Negligible	Negligible	St, T, D
Construction	Health effects from changes in transport nature and flow rate	Negligible	Negligible	St, T, In
Decommissioning	As set out for 'construction' above	Negligible	Negligible	St, T, D and In
Operation	Health effects from changes in air quality – traffic emissions	Negligible	Negligible	P, D
Operation	Health effects from changes in air quality – process emissions	Not measurable and there would be no material change in the baseline health for the population living in proximity of the Proposed Development.	Not measurable and there would be no material change in the baseline health for the population living in proximity of the Proposed Development.	N/A

Development Stage	Environmental Receptor	Level of Effect (following initial development design and impact avoidance / reduction measures)	Residual Level of Effect (following further mitigation and monitoring)	Nature of Effect
Operation	Health effects from changes in air quality – dust and odour	Overall, it is not anticipated that there would be any material change to dust and odour emissions from the proposed Low Carbon CHP Facility in comparison to existing operations.	Overall, it is not anticipated that there would be any material change to dust and odour emissions from the proposed Low Carbon CHP Facility in comparison to existing operations.	N/A
Operation	Health effects from changes in noise exposure	Negligible	Negligible	P, D
Operation	Health effects from changes in transport nature and flow rate	Negligible	Negligible	P, In

